

(No Model.)

A. B. SMITH.
BOILER TUBE SCRAPER.

No. 331,093.

Patented Nov. 24, 1885.

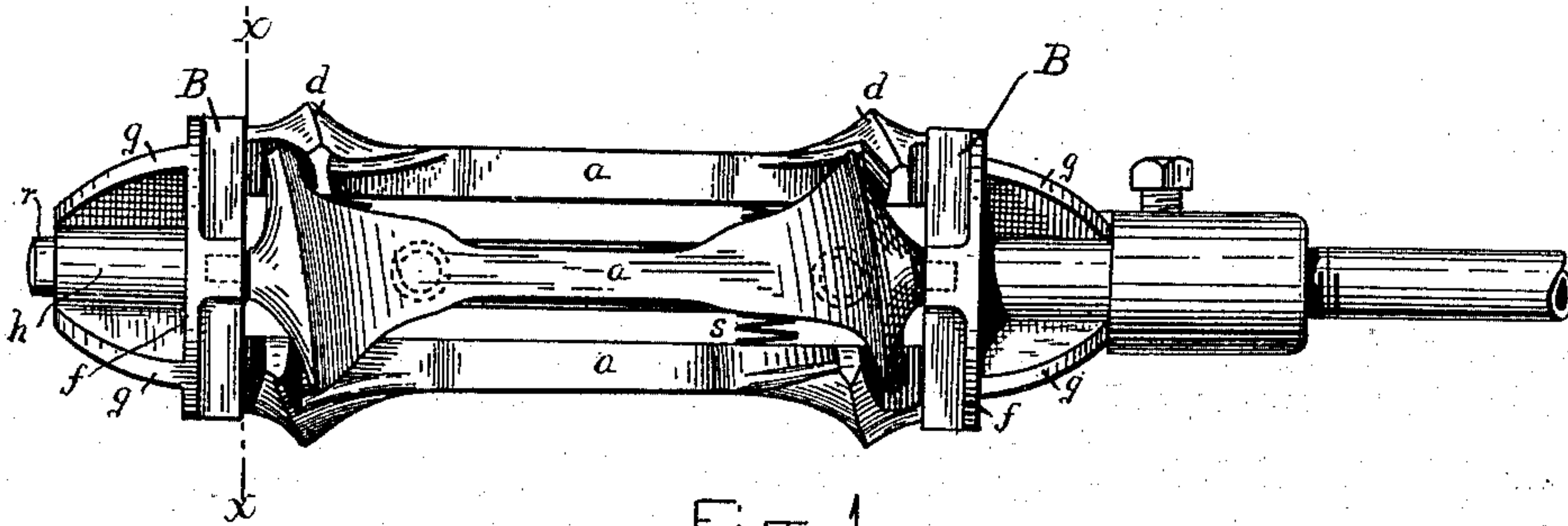


Fig. 1.

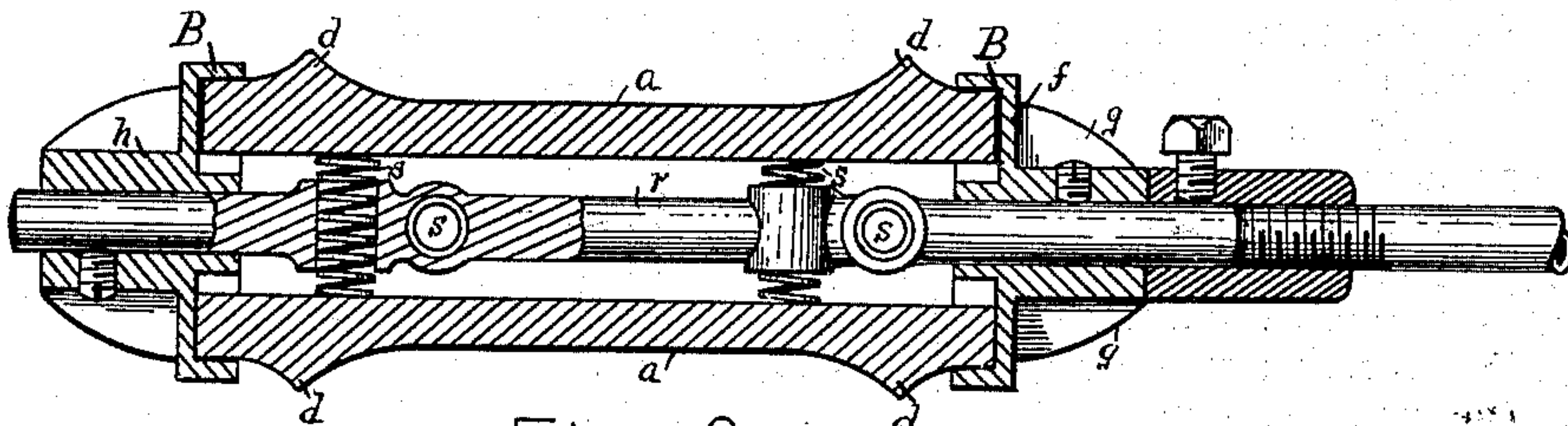


Fig. 2.

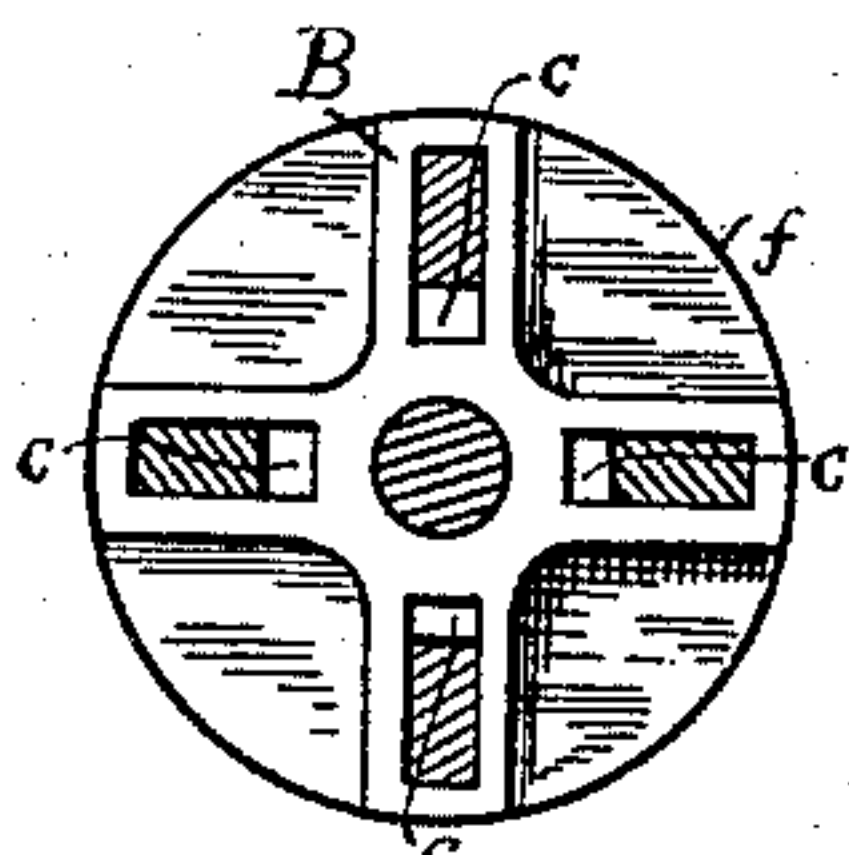


Fig. 3.

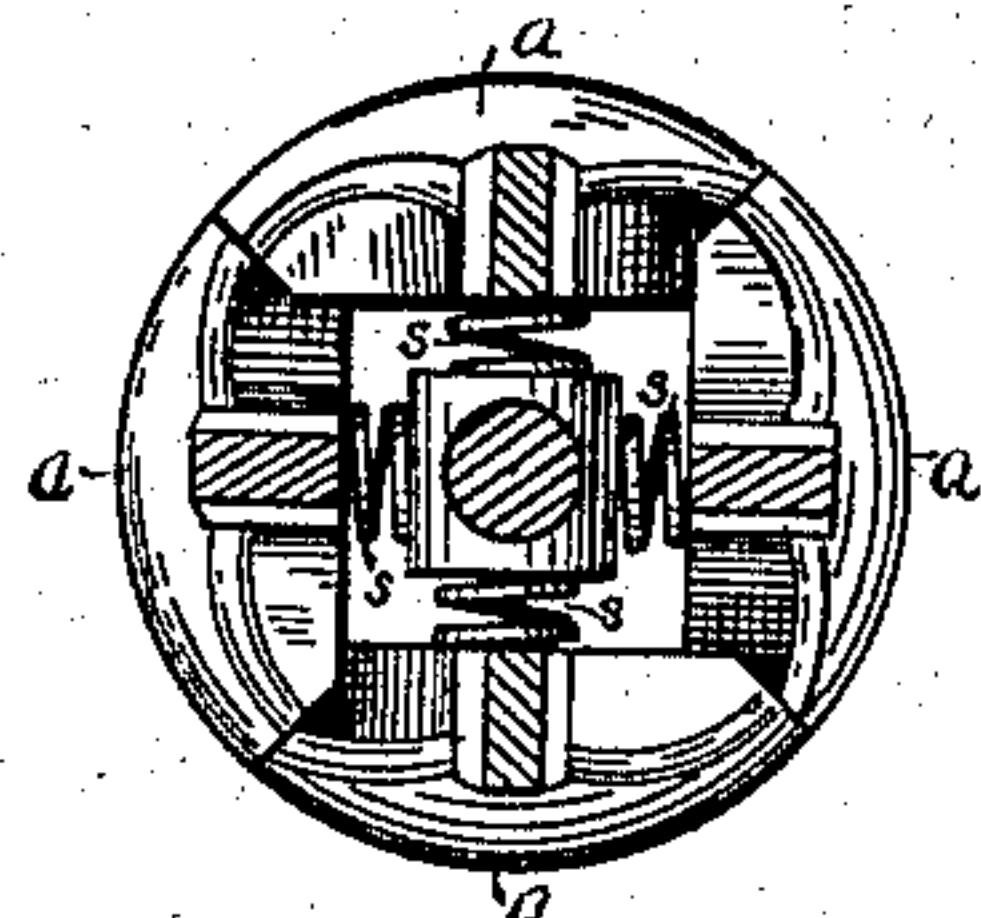


Fig. 4.

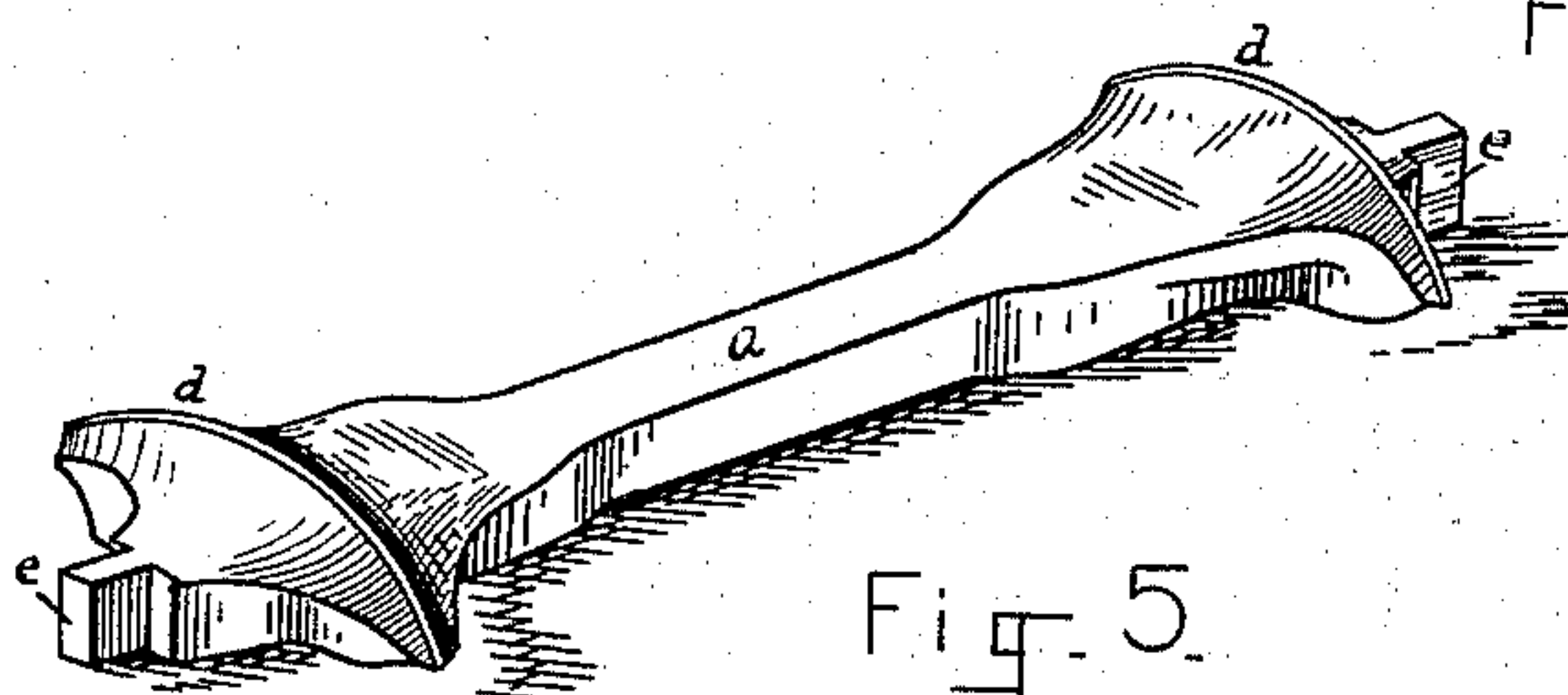


Fig. 5.

WITNESSES:
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AZEL B. SMITH, OF LOWELL, MASSACHUSETTS.

BOILER-TUBE SCRAPER.

SPECIFICATION forming part of Letters Patent No. 331,093, dated November 24, 1885.

Application filed April 15, 1885. Serial No. 162,361. (No model.)

To all whom it may concern:

Be it known that I, AZEL B. SMITH, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Boiler-Tube Scraper, for use in cleaning the dust and soot from the tubes of boilers, of which the following is a specification.

My invention relates to that class of tube-scrappers where there are several scraping-edges held in contact with the periphery of the tube by springs, the whole device being fastened upon the end of a long rod, so that it may be thrust through the entire length of the boiler-tube, carrying the dust and soot before it.

My improved tube-scraper is illustrated in the accompanying drawings, in which Figure 1 is an elevation of the complete device. Fig. 2 is a longitudinal section of the same. Fig. 3 is a transverse section at the line *x x*, Fig. 1, showing the construction of the head B. Fig. 4 is a transverse section at the same line, *x x*, Fig. 1, but showing the arrangement of the scraping-sections and their accompanying springs as well as the method of supporting the springs. Fig. 5 is a perspective view, upon a larger scale, of one of the scraping-sections.

Similar letters refer to similar parts throughout the several views.

The central spindle, *r*, has fastened to it the two heads B B, one or both of them being easily removable for repairs when necessary. The spindle *r* is also furnished with four cylindrical holes supporting the four spiral springs *s s s s*. The four springs *s s s s* are arranged in pairs, the springs of one pair being at right angles to each other and as near one head B as practicable, while the springs of the other pair are at right angles to each other and as near the other head B as practicable. The heads B B are made alike, and are each furnished with four radial slots, *c c c c*, in which slide the projections *e e* of the four scraper-sections *a a a a*. They are also each furnished with a web, *f*, which, when the device is in use, serves to push out any loose dirt which may be in the boiler-tube, and several guide-ribs, *g*, which aid in the insertion of the device into the end of the tubes, the whole being connected together and fastened to the spindle *r* by means of the hub *h*. The four scraper-sections *a a a a* are all alike, and are each furnished

with the projections *e e* and the scraping-edges *d d*, as is shown in detail in Fig. 5. The scraping-edges *d d* are made of such a shape that the edge of one section laps by the edges of its neighboring sections, as is plainly shown in Fig. 1, thus insuring that every part of the boiler-tube shall be scraped, in whatever position it is possible for the sections to be placed when in use.

All the parts are put together as is shown in Figs. 1 and 2, and when so put together the heads B B support and guide the sections *a a a a*, allowing some radial motion to each. The springs *s s s s* are supported by the holes left for the purpose in the spindle *r*, each end of each spring resting upon a scraping-section, *a*, forcing the two sections as far apart as the radial slots in the heads will allow, and allowing either end of any section to yield to a sufficient pressure tending to force it toward the spindle *r* independently of the other end of the same section, or of either end of any other section. The diameter of the circle formed by the outer edges of the sections *a a a a* is, when the device is outside the tube, slightly larger than the internal diameter of the boiler-tubes, while the outer diameter of the web *f* is slightly smaller than the same.

When the device is used, it is forced into the end of the tube, the end of the tube bearing on the curved portions of the sections *a a a a* outside the scraping-edges *d d d d*, and forcing the sections sufficiently inward to allow the whole device to enter the tube. The scraping-edges are now held with all the force of the springs *s s s s* to the periphery of the tube, and when the device is forced through the same the web *f* carries any loose dirt which may be therein before it, while the scraping-edges *d d d d* effectually remove any closely-adhering scale. The same actions are repeated when the device is drawn back and out of the tube.

I am aware that boiler-tube scrapers have hitherto been made where a series of scraping-sections have been held to the surface of the boiler-tube by flat springs, which allowed either end of any section to yield to the pressure of the tube independently of any other end of a section; but these springs have proved to be inefficient, since their temper is rapidly destroyed by the hot gases from the boiler-

furnace. With my device the cylindrical
holes in the central spindle, *r*, protect the spi-
ral springs from this action of the hot gases,
while the peculiar arrangement of the spiral
5 springs which I use makes the whole device
much more flexible and efficient than is possi-
ble with the older inventions.

What I claim as new, and desire to secure
by Letters Patent, is—

10 In a boiler-tube scraper, the combination of
the pair of radially-grooved heads with pairs
of scraping-sections supported by the said

heads, a central spindle provided with aper-
tures at right angles to its axis, and spiral
springs supported in the said apertures, each 15
of the said springs acting upon a pair of the
said scraping-sections to force them in oppo-
site directions, substantially as described, and
for the purposes specified.

AZEL B. SMITH.

Witnesses:

WM. H. ANDERSON,
CHARLES H. FISHER.